

hospital personnel, 7.4% of surgeons, and 5.2% to 10.7% of operating room staff are sensitive to latex.

The usual progression of symptoms seen in latex-allergic health care workers is first contact dermatitis or localized urticaria, and then systemic symptoms—generalized urticaria, rhinitis, asthma, and, rarely, anaphylaxis. Some nonmedical professions that involve latex exposure are kitchen work, the rubber industry, or the manufacture of rubber products such as toys, gloves, and rubber bands. The prevalence of latex allergy in these groups is less well known, but one recent study in a latex glove plant showed sensitization in 11% of workers.

The diagnosis of IgE-mediated latex allergy can be confirmed by skin prick or radioallergosorbent testing (RAST). There are currently no standardized commercial extracts for skin testing available in the United States, but such products are available in Canada and Europe. Several latex RAST allergens are available. Older RAST methods had only a 60% to 65% sensitivity rate, but newer tests recently approved by the US Food and Drug Administration have higher sensitivity rates.

Preventing occupational exposure of health care workers requires the use of nonlatex, low antigen-containing or powder-free gloves and latex substitutes for nonglove products. In operating rooms, the airborne latex allergen level can be high enough to cause respiratory symptoms in highly sensitized workers and patients. A future goal is the production of rubber products that have no or very low allergenicity.

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Value of Home Peak Flow Monitoring for Asthma Control

HOME PEAK FLOW MONITORING is recommended by the National Heart, Lung, and Blood Institute's National Asthma Education and Prevention Program: Guidelines for the diagnosis and management of asthma for all patients with asthma who are aged 5 years and older. The guidelines suggest that measuring peak flow is necessary in the management of asthma, in much the same way that blood pressure monitoring is necessary to manage hypertension and blood glucose monitoring is necessary to manage diabetes mellitus. Yet, controversy and resistance surround the use of home peak flow monitoring for the management of asthma. Many physicians consider it burdensome, unreliable, and of questionable value. Others find that they lack the training to effectively use the daily measurement records their patients bring them.

The peak expiratory flow rate is the fastest flow rate that can be sustained for 10 milliseconds during a maxi-

mal expiratory effort after full inspiration. The value obtained, in liters per minute on a home peak flow meter, is effort-dependent and, when a maximal effort is made, indicates the caliber of large airways. Peak flow is abnormally decreased only in patients with moderate to severe airway obstruction. Except when extremely low, absolute values are an unreliable guide to the severity of airflow obstruction because the range of peak flow is not linear in its clinical importance. A change of 100 liters per minute is more relevant at the lower end of the scale than at the upper end; but trends within individual patients are valuable over time.

Home peak flow monitoring is not without pitfalls, as the measure is effort-dependent, requiring a maximal expiratory effort. To increase the reliability of measurements, patients are instructed to make three maximal attempts and record the highest value. Performance technique may wane with time, however, and the best approach is to have the patient demonstrate the peak flow expiratory maneuver at each office visit. Other problems include inaccurate reading or recording and fungal growth inside the meter. The greatest pitfall of the current meters is their reliance on consistent and accurate patient self-measurement. Compliance can become a problem if the patient sees no value in making the daily measurements. Similarly, if patients are asked to make measurements and fill out diaries without being told what the numbers mean and what to do in response, compliance decreases considerably with time. Only when peak flow monitoring is tied to action plans that require the patient to understand the value and self-manage the illness do results improve.

When patients use peak flow measurements, both compliance and clinical outcomes appear to improve. Health care professionals must understand and explain clearly the implications of peak flow values for individual patients. When records indicate that a peak flow value has fallen substantially, the opportunity should be taken to explore the history of that event and to teach the patient the correct and most appropriate actions to take. When patients have taken appropriate action, it is important to use the opportunity to provide positive reinforcement. The directions for actions to take to manage asthma exacerbations must be explicit and specific to a person's clinical profile. For example, when a peak flow value falls to a predetermined level, the patient should be instructed to use rescue medication.

There are several possible advantages of home peak flow monitoring. Episodes of airflow obstruction, for which treatment is indicated, can be identified. Patterns of peak flow that suggest increased risk, such as morning dips or wide diurnal variation, can be documented. By matching objective measurements to subjective sensations, symptom recognition may be enhanced, especially in those with a poor perception of airflow obstruction. Home monitoring allows peak flow-guided self-management using self-adjusted medications—a true partnership approach between professional and patient. Finally, peak flow monitoring may result in more appropriate, less frequent, use of inhaled β -agonist rescue medication.

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Caution With Inhaled Corticosteroids in Childhood Asthma

THE USE OF INHALED corticosteroids for the treatment of childhood asthma is increasing for almost all degrees of severity. The corticosteroid aerosols available in the United States for asthma (beclomethasone dipropionate, triamcinolone acetonide, and flunisolide) are all highly effective. Nevertheless, many physicians are reluctant to use them, especially in children, because of uncertainty and controversy regarding the associated risk.

Only 10% to 15% of inhaled corticosteroids administered by a metered-dose inhaler is deposited in the lungs. Most of each dose is deposited in the posterior pharynx and mouth and is ingested and variably absorbed through the gastrointestinal tract. Inhaled corticosteroids are also absorbed directly through the lungs. Nasal delivery of topical corticosteroids for rhinitis may also contribute to systemic absorption.

Although there has always been a concern of increased susceptibility to infection with the use of inhaled corticosteroids, 20 years of experience, particularly with beclomethasone dipropionate, has shown that the incidence or severity of viral or bacterial infections in immunocompetent patients is not increased. Caution should be used, however, in children who are immunocompromised or who have tuberculosis or other chronic infection of the lungs.

Oropharyngeal or laryngeal candidiasis or dysphonia due to local effects on laryngeal muscles can complicate inhaled corticosteroid therapy. It is uncommon to need to discontinue treatment of these complications, however. Mouth rinsing after dosing and the use of a spacer device are effective remedies for these local problems.

The use of oral corticosteroids is well established as a cause of growth retardation in children, so their use in this population has been closely monitored. Data from several long-term clinical trials have shown no effect on growth in asthmatic children at doses of less than 800 mg per day. Exceptions to this include recent reports of a reduction in lower leg growth over a short-term period of treatment with 800 mg per day of budesonide and a decrease in growth velocity in prepubescent boys using 400 µg per day of beclomethasone dipropionate. Examining the effect of inhaled corticosteroids on growth in children, however, is complicated by studies showing that severe asthma without inhaled corticosteroid therapy can be associated with delayed puberty and growth rates and that growth velocity may not correlate with final adult height.

Alterations in bone metabolism leading to osteoporosis after long-term inhaled corticosteroid use is also a possible concern. Inhaled corticosteroids clearly have an effect on bone metabolism when sensitive markers of biochemical bone turnover and deposition (such as urinary hydroxyproline, osteocalcin, or alkaline phosphatase) are measured. Reduced bone mineral density has been noted in adults, but not children, on long-term inhaled corticosteroid therapy, although results have often been complicated by the concomitant administration of oral corticosteroids. To date, there is no information to suggest that treatment solely with inhaled corticosteroids leads to clinically important osteoporosis or fractures.

Inhaled corticosteroid therapy can lead to alterations in hypothalamic-pituitary-adrenal axis function at almost any dose when sensitive markers are examined. But only rare anecdotal reports of problems of clinical insufficiency or Cushing's syndrome have been published. The morning serum cortisol value is rarely affected by inhaled corticosteroid use unless the dose is high. The clinical meaning of alterations in more sensitive HPA axis markers is unknown. Thus, steroid replacement therapy for children on inhaled corticosteroid therapy who are undergoing a surgical procedure is not generally necessary.

The different inhaled corticosteroid preparations do have varying degrees of systemic absorption, but whether these differences in systemic bioavailability have any clinical relevance with regard to toxicity at conventional doses is still not known. The trend toward the use of higher doses of inhaled corticosteroids may make these differences more important because the systemic effects are dose related. Children can vary widely in their susceptibility, probably because of intrinsic differences in pharmacokinetics and end-organ sensitivity. Inhalation technique, the use of a spacer, mouth rinsing, and dosing frequency are other determinants that likely contribute to the systemic effects of inhaled corticosteroids.

We can expect recommendations in the future for more aggressive use of inhaled corticosteroids for children with allergic disease. The systemic problems of inhaled corticosteroids in most patients on low to moderate conventional doses are inconsequential. Higher doses are more effective but also more active systemically. When compared with the use of oral steroids, the tradeoff is likely still in favor of high-dose inhaled corticosteroids. The actual adverse systemic effects from the long-term use of intermediate- or high-dose inhaled corticosteroids in children is still unknown, and this must be kept in mind when prescribing prolonged inhaled corticosteroid therapy in this population.

Until more information is available, the following recommendations or precautions should be followed with inhaled corticosteroid treatment in children:

- Use the lowest effective dose of inhaled corticosteroids, preferably below 800 µg per day (some asthma experts recommend beginning treatment with a non-steroidal anti-inflammatory medication such as cromolyn sodium or nedocromil);